

What is claimed is:

500A' 1. A method of data transmission between first and second modems over a network comprising a narrowband network, the method comprising:  
providing first and second gateways, the first gateway connected to the first modem, the second gateway connected to the second modem, and the first and second gateways connected via the narrowband network;  
transmitting modulated signals from the first modem to the first gateway;  
demodulating the signals at the first gateway to obtain demodulated data;  
transmitting the demodulated data over the narrowband network;  
re-modulating the demodulated data at the second gateway;  
transmitting the re-modulated signals from the second gateway to the second modem;  
establishing an end-to-end error correcting protocol between the first and second modems;  
monitoring at the first gateway the demodulated data to be transmitted over the narrowband network  
suspending the transmission of signals from the first modem if a transmission rate of the demodulated data to be transmitted over the narrowband network exceeds a first value; and  
resuming the transmission of signals from the first modem if the transmission rate is less than a second value.

2. The method according to claim 1, wherein monitoring the demodulated data further comprises:

storing the demodulated data to be transmitted over the narrowband network in a transmit buffer;

comparing an amount of the demodulated data stored in the transmit buffer to a third value to determine if the transmission of the modulated signals from the first modem should be suspended.

3. The method according to claim 2, wherein suspending the transmission of signals further comprises:

generating a valid RNR frame;

modulating the RNR frame at the first gateway; and

transmitting the RNR frame to the first modem.

4. The method according to claim 3, wherein resuming the transmission of signals comprises:

generating a valid RR frame;

modulating the RR frame at the first gateway; and

transmitting the RR frame to the first modem.

5. The method according to claim 4, further comprising:

maintaining at the first gateway a first value indicating a current flow control state of the first modem;

receiving at the first gateway a supervisory frame from the narrowband network, the  
supervisory frame for control of flow of data between the modems, the  
supervisory frame including a second value indicating a flow control state;  
comparing the first and second values;  
modifying the supervisory frame from an RR frame to a valid RNR frame if the first  
value does not match the second value; and  
transmitting the RNR frame to the first modem.

6. The method according to claim 1, wherein transmitting the demodulated data over the narrowband network comprises:

removing first non-informational data from the demodulated data;  
transmitting the modified demodulated data without the first non-informational data  
over the narrowband network;  
generating second non-informational data when no data is received from the  
narrowband network; and  
combining the second non-informational data and the modified demodulated data.

7. The method according to claim 6, wherein removing first non-informational data from the demodulated data comprises:

storing the demodulated data in a transmit buffer at the first gateway; and  
removing first non-informational data from the transmit buffer;  
and wherein combining the second non-informational data and the modified  
demodulated data comprises:

storing the modified demodulated data in a receive buffer at the second gateway; and inserting the second non-informational data into the receive buffer after a last received frame of the modified demodulated data.

8. The method according to claim 7, wherein the non-informational data comprises inter-frame fill flags.
9. The method according to claim 1, further comprising:  
discriminating at the first gateway between voice and voice band data modulated signals; and  
switching at the first gateway to an alternate mode of signal processing to process voice band data as modem tones and modulated signal instead of voice.
10. The method according to claim 1, wherein the first gateway comprises a codec, a voice band data modem, and a fax modem, the method further comprising:  
discriminating at the first gateway between voice, voice band data, and fax modulated signals from the first modem;  
processing the voice signals using the codec;  
processing the voice band data signals using the voice band data modem; and  
processing the fax signals using the fax modem.
11. The method according to claim 1, further comprising:

implementing at the first gateway, first modem training between the first modem and the first gateway;

implementing at the second gateway, second modem training between the second modem and the second gateway;

adjusting duration of the first modem training based on progress of the second modem training; and

adjusting duration of the second modem training based on progress of the first modem training.

12. The method according to claim 1, wherein the first gateway has a first memory having a memory size, the method further comprising:

modifying at the first gateway supervisory data so that a maximum message length transmitted between the first and second modems is less than a predetermined limit based on the size of the first memory.

13. The method according to claim 1, wherein the narrowband network comprises a digital network; and the modulated signals from the first modem comprise pulse code modulated signals.

14. The method according to claim 1, wherein the narrowband network comprises a satellite network.

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15. The method according to claim 1, wherein the narrowband network has a channel rate, the method further comprising:

selecting at the first and second gateways a modulation and demodulation scheme based on capabilities of the first and second modems and the channel rate.

16. The method according to claim 15, wherein the first and second modems comprise V.34 modems, and the capabilities of the first and second modems are determined by decoding a V.8 answer sequence generated by the first and second modems.

17. The method according to claim 15, wherein the first modem comprises a modem selected from the group consisting of a V.32 modem, a V.32 bis modem, a V.34 modem operating in auto-mode, and a V.90 modem operating in auto-mode, and wherein the selection of the modulation and demodulation scheme comprises detection of an 1800 Hz tone from the first modem.

18. The method according to claim 15, wherein the modulation and demodulation scheme and a rate of modulation and demodulation at the first and second gateways is different.

19. The method according to claim 18, wherein the modulation and demodulation scheme at the first gateway is V.32 at 4800 bps, and the modulation and demodulation scheme at the second gateway is V.22 bis at 2400 bps.

20. The method according to claim 18, wherein the modulation and demodulation scheme at the first gateway is V.32 at 9600 bps, and the modulation and demodulation scheme at the second gateway is V.32 at 4800 bps.

21. The method according to claim 18, wherein the modulation and demodulation scheme at the first gateway is V.32 bis at 14,400 bps or 12,000 bps or 9600 bps or 7200 bps or 4800 bps, and the modulation and demodulation scheme at the second gateway is V.32 bis at 14,400 bps or 12,000 bps or 9600 bps or 7200 bps or 4800 bps.

22. The method according to claim 1, wherein the end-to-end error correcting protocol is detected by the first gateway by decoding a V.8 sequence transmitted by the first and second modems.

23. The method according to claim 1, wherein the error correcting protocol is selected from a group consisting of V.42 LAPM and an error correcting protocol as defined in V.42 Annex A.

24. A method of data transmission between first and second modems over a network comprising a narrowband network, the method comprising:

providing first and second gateways, the first gateway connected to the first modem,  
the second gateway connected to the second modem, the first and second  
gateways connected via the narrowband network;  
transmitting a first signal from the first modem to the first gateway;

demodulating the first signal at the first gateway to generate demodulated data;  
modifying the demodulated data to remove first non-informational data;  
transmitting the modified demodulated data over the narrowband network;  
regenerating the demodulated data by inserting second non-informational data into the  
modified demodulated data;  
modulating the regenerated demodulated data at the second gateway to generate a  
second signal;  
transmitting the second signal from the second gateway to the second modem; and  
establishing an end-to-end protocol between the first and second modems, the protocol  
selected from a group consisting of an error correcting protocol or an  
asynchronous protocol.

25. The method according to claim 24, wherein modifying the demodulated data  
comprises:

storing the demodulated data in a transmit buffer at the first gateway; and  
removing first non-informational data from the transmit buffer;  
and wherein regenerating the demodulated data comprises:  
storing the modified demodulated data in a receive buffer at the second gateway; and  
inserting second non-informational data into the receive buffer after a last received  
frame of the modified demodulated data.

26. The method according to claim 25, wherein the non-informational data comprises inter-  
frame fill flags.



27. The method according to claim 24, wherein the first gateway has a first memory having a memory size, the method further comprising:

modifying at the first gateway supervisory data so that a maximum message length transmitted between the first and second modems is less than a predetermined limit based on the size of the first memory.

28. The method according to claim 24, wherein

the narrowband network comprises a digital network; and

the first and second signals comprise pulse code modulated signals.

29. A gateway for voice band data transmission over a network comprising a first modem connected to the gateway, a second modem connected to a second gateway, and a narrowband network connecting the gateway and the second gateway, the gateway comprising:

a voice band data modem for demodulating signals received from a first user modem to generate demodulated data for transmission over the narrowband network, and

for modulating data received from the narrowband network;

a voice band data protocol for inter-networking of the first and second modems; and

a partial V.42 protocol for:

detecting establishment of an end-to-end error correcting protocol between the

first and second modems,

monitoring at the first gateway the demodulated data,

suspending transmission of the signals from the first modem if a transmission rate of the demodulated data to be transmitted over the narrowband network exceeds a first value, and resuming transmission of the signals from the first modem if the transmission rate is less than a second value.

30. The gateway according to claim 29 comprising:  
a receive buffer for storing the data received from the narrowband network; and  
a transmit buffer for storing the demodulated data to be transmitted over the narrowband network;  
and wherein the partial V.42 protocol compares an amount of the demodulated data stored in the transmit buffer to a third value to determine if transmission of the signals from the first modem should be suspended.
31. The gateway according to claim 30 wherein the suspension of transmission of signals from the first modem comprises:  
generating a valid RNR frame;  
modulating the RNR frame; and  
transmitting the RNR frame to the first modem.
32. The gateway according to claim 31 wherein the resumption of transmission of signals from the first modem comprises:  
generating a valid RR frame;

modulating the RR frame; and  
transmitting the RR frame to the first modem.

33. The gateway according to claim 30, wherein the partial V.42 protocol further comprises logic for:

removing first non-informational data from the transmit buffer; and  
inserting second non-informational data into the receive buffer after a last received frame of the data received from the narrowband network.

34. The gateway according to claim 29, further comprising a memory having a memory size, and wherein the partial V.42 protocol further comprises logic for:

modifying supervisory data received from the narrowband network so that a maximum message length transmitted between the first and second modems is less than a predetermined limit based on the size of the memory.